# Forecasting CPI Inflation Components with Hierarchical Recurrent Neural Networks

## Discussion

# Main takeaways

- Higher levels in the Consumer Price Index hierarchy can provide information to improve forecasts for their sub-aggregates
- **Informative regularization**: Sub-aggregate parameters are kept closer to parent level parameters with strength proportional to historical correlations (custom loss function)
- Better performances compared to alternative forecasting methods

# Discussion points

- Correlation between levels and aggregation weights: is there a connection?
- Beyond Neural Networks: Gradient Boosted Trees, Prophet (Taylor & Letham, 2018), and NeuralProphet (Triebe *et al.*, 2021)
- Using the hierachy to *look forward*: leveraging higher level forecasts to tune sub-aggregates ones
- Online prices: Macias, Stelmasiak and Szafranek (2022) and the experience of NBP

# References


- Macias, P., Stelmasiak, D., Szafranek, K. (2022) Nowcasting food inflation with a massive amount of online prices, International Journal of Forecasting, https://doi.org/10.1016/j.ijforecast.2022.02.007
- Taylor, S. J., Letham, B. (2018) Forecasting at scale. The American Statistician, 72(1):37–45, https://doi.org/10.1080/00031305.2017.1380080
- Triebe, O., Hewamalage, H., Pilyugina, P., Laptev, N., Bergmeir, C., Rajagopal, R. (2021) NeuralProphet: Explainable Forecasting at Scale, arXiv, https://doi.org/10.48550/arXiv.2111.15397

# Thank you

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